

CLAIMS

1. An exhaust gas control system for an internal combustion engine, which includes a filter for capturing particulate matter in exhaust gas discharged from an internal combustion engine, the filter being provided in an exhaust passage for the internal combustion engine, and in which an entire range of an engine operating state decided by a rotational speed and torque of the internal combustion engine includes a first operating state range where a temperature of the exhaust gas discharged from the internal combustion engine is low, and the particulate matter captured by the filter is not oxidized and an amount of the particulate matter deposited in the filter increases if a recovery process is not performed, and a second operating state range where the temperature of the exhaust gas discharged from the internal combustion engine is high, and the particulate matter captured by the filter is oxidized and the amount of the particulate matter deposited in the filter decreases even if the recovery process is not performed, characterized by comprising:

filter forced recovery means for performing the recovery process that removes the particulate matter captured by the filter by forcibly oxidizing the particulate matter so as to recover a capturing ability of the filter; and

deposited amount detection means for detecting an amount of the particulate matter that is captured by the filter and deposited in the filter, wherein:

the filter forced recovery means performs the recovery process when the amount of the particulate matter deposited in the filter which is detected by the deposited amount detection means becomes equal to or larger than a predetermined amount in a case where the operating state of the internal combustion engine belongs to the first operating state range; and

the filter forced recovery means performs the recovery process based on a continuous belonging time period during which the operating state of the internal combustion engine continues to belong to the second operating state range in a case where the operating state of the internal combustion engine belongs to the second operating state range.

2. The exhaust gas control system according to claim 1, characterized in that the filter forced recovery means performs the recovery process when a continuous belonging time period during which the operating state of the internal combustion engine continues to belong to the second operating state range becomes equal to or longer than a predetermined

time period in a case where the operating state of the internal combustion engine belongs to the second operating state range.

3. The exhaust gas control system according to claim 2, characterized in that the predetermined time period is decided based on the amount of the particulate matter deposited in the filter which is detected by the deposited amount detection means when the operating state of the internal combustion engine starts to belong to the second operating state range.

4. The exhaust gas control system according to claim 1, characterized in that the filter forced recovery means performs the recovery process when an accumulated time period during which the operating state of the internal combustion engine belongs to the second operating state range after a previous recovery process is finished in a case where the operating state of the internal combustion engine belongs to the second operating state range.

5. A method for recovering a filter of an exhaust gas control system for an internal combustion engine, which includes a filter for capturing particulate matter in exhaust gas discharged from an internal combustion engine, the filter being provided in an exhaust passage for the internal combustion engine; filter forced recovery means for performing a recovery process that removes the particulate matter captured by the filter by forcibly oxidizing the particulate matter so as to recover a capturing ability of the filter; and deposited amount detection means for detecting an amount of the particulate matter captured by the filter and deposited in the filter, and in which an entire range of an engine operating state decided by a rotational speed and torque of the internal combustion engine includes a first operating state range where a temperature of the exhaust gas discharged from the internal combustion engine is low, and the particulate matter captured by the filter is not oxidized and an amount of the particulate matter deposited in the filter increases if a recovery process is not performed, and a second operating state range where the temperature of the exhaust gas discharged from the internal combustion engine is high, and the particulate matter captured by the filter is oxidized and the amount of the particulate matter deposited in the filter decreases even if the recovery process is not performed, characterized by comprising the steps of:

detecting the amount of the particulate matter deposited in the filter using the

deposited amount detection means in a case where the operating state of the internal combustion engine belongs to the first operating state range;

performing the recovery process using the filter forced recovery means when the detected amount of the particulate matter deposited in the filter becomes equal to or larger than a predetermined amount in the case where the operating state of the internal combustion engine belongs to the first operating state range;

performing the recovery process using the filter forced recovery means based on a continuous belonging time period during which the operating state of the internal combustion engine continues to belong to the second operating state range in a case where the operating state of the internal combustion engine belongs to the second operating state range.

6. The method for recovering a filter according to claim 5, characterized by further comprising the step of performing the recovery process using the filter forced recovery means when a continuous belonging time period during which the operating state of the internal combustion engine continues to belong to the second operating state range becomes equal to or longer than a predetermined time period in a case where the operating state of the internal combustion engine belongs to the second operating state range.

7. The method for recovering a filter according to claim 5, characterized by further comprising the step of performing the recovery process when an accumulated time period during which the operating state of the internal combustion engine belongs to the second operating state range after a previous recovery process is finished in a case where the operating state of the internal combustion engine belongs to the second operating state range.